

REMARKS

Claims 1-2, 5-7, 9-13, 16-18 and 20-23 are pending in the application. Claims 1, 4-7, 10, 12, 15-18, 21, and 22 are amended. Claims 23 and 24 are added. Claims 3, 4, 14 and 15 are canceled.

The Examiner wrote "because there is no specific definition of the term 'R-unit' in the claim or specification nor is it a term well-known in the art, the Examiner is taking it to be the name of a unit".

To the contrary, Applicants' Specification indicates that 'R-unit' is short for "recovery unit" and states "[a] detailed description of a recovery unit for mirrored processors is found in U.S. Patent No. 5,692,121 to Bozso et al., issued November 25, 1997, and incorporated by reference." (Applicants' Specification, page 1, lines 4-8). In brief, the recovery unit (R-unit) contains the architected state of the processor as well as the state of the internal controls of the processor. The Examiner is directed to U.S. Patent No. 5,692,121 to Bozso et al. for further details. Therefore, the term 'R-unit' is defined.

The claims, abstract, and title are amended to replace the term "R-unit" with the equivalent term "recovery unit", which is not new matter and is supported by the specification, including page 1, lines 4-8.

The Office Action rejected claims 1-3, 5-7, 9, 10, 12-14, 16, 20 and 21 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,471,591 to Edmondson et al. ("Edmondson").

Anticipation under 35 U.S.C. § 102(b) is established when the Examiner provides a single reference that teaches or enables each of the claimed elements arranged as in the claim.

Applicants traverse the rejections of claims 1-3, 5-7, 9, 10, 12-14, 16, 20 and 21, because Edmondson fails to disclose each of the claimed elements arranged as in the claims.

Edmondson discloses an interlock on operands that are dependent on operands from instructions that have not retired yet. In contrast, the claimed invention covers scenarios not disclosed in Edmondson, i.e., when operands from retired instructions are still not available to be read due to the additional stages for a recovery unit checkpoint pipeline. Edmondson fails to disclose any recovery unit. The claimed recovery unit holds ECC protected, check-pointed

copies of registers that may be recovered in the case of an error. In the claimed invention, entries are moved from a pre-write queue to a write queue when written and remain in the write queue until after the corresponding instruction is retired (check-pointed). The write queue provides an additional interlock (not disclosed in Edmondson) from the time the operands are retired (check-pointed) until drained into an SRAM where they are then available to be read. (See generally, Applicant's Specification, pages 1-7, figure 1.)

Claim 1 recites, *inter alia*, "recovery unit register addresses" and "a write queue". Edmondson fails to disclose these elements. By contrast, Edmondson discloses a "source specifier queue" and a "destination specifier queue", which are similar to a read queue and a pre-write queue. (Edmondson, col. 4, lines 4-60). Neither the source specifier queue nor the destination specifier queue is at all like the claimed write queue, because the claimed write queue is used to provide an additional window. The write queue provides an additional interlock (not disclosed in Edmondson) from the time the operands are retired (check-pointed) until drained into an SRAM where they are then available to be read. Furthermore, Edmondson fails to disclose recovery unit register addresses. By contrast, the "register specifiers" of Edmondson are part of an execution unit, not a recovery unit. (Edmondson, col. 4, lines 9-60). Edmondson fails to disclose any recovery unit. Therefore, claim 1 is patentable over Edmondson.

Claim 2 recites, *inter alia*, "wherein one of said write-before-read interlocks causes a millicode read instruction not to execute". The claimed interlock encompasses the additional window, not disclosed by Edmondson. Therefore, for the reasons given above, claim 2 is patentable over Edmondson.

Claim 5 recites, *inter alia*, "wherein said comparing includes comparing said recovery unit register addresses sent to said read queue against said recovery unit register addresses sent to said write queue". The claimed recovery unit register addresses and write queue are not disclosed in Edmondson, as discussed above. Therefore, claim 5 is patentable over Edmondson.

Claim 6 recites, *inter alia*, "wherein said determining includes matching valid recovery unit register addresses of said write queue and said read queue". The claimed recovery unit register addresses and write queue are not disclosed in Edmondson, as discussed above. Therefore, claim 6 is patentable over Edmondson.

Claim 7 recites, *inter alia*, "wherein said determining also includes matching said valid recovery unit register addresses of said pre-write queue and said read queue". The

claimed recovery unit register addresses is not disclosed in Edmondson, as discussed above. Therefore, claim 7 is patentable over Edmondson.

Claim 9 recites, *inter alia*, "wherein said one or more write-before-read interlocks prevent millicode read instructions from being processed". The claimed interlock encompasses the additional window, not disclosed by Edmondson. Therefore, for the reasons given above, claim 9 is patentable over Edmondson.

Claim 10 recites, *inter alia*, "wherein a write queue accumulates said recovery unit register addresses". The claimed recovery unit register addresses and write queue are not disclosed in Edmondson, as discussed above. Therefore, claim 10 is patentable over Edmondson.

Claims 12, 13, 16, 20, and 21 to an exemplary system embodiment include similar patentable subject matter to the exemplary method embodiment and are patentable over Edmondson for the reasons given above.

The Office Action rejected claims 4, 11, 15, 17, 18 and 22 under 35 U.S.C. § 103(a) as being unpatentable over Edmondson in view of the article by Hennessy et al. ("Hennessy").

Obviousness under 35 U.S.C. § 103(a) is established when the Examiner provides a combination of references that teach each of the claimed elements.

Claims 11, 17, 18, and 22 are patentable over the combination of Edmondson and Hennessy, for the reasons given above and because Hennessy does not cure the elements lacking in Edmondson, e.g., no recovery unit, no write queue, no additional window.

For all the reasons advanced above, it is respectfully submitted that the application is in condition for allowance. Accordingly, reconsideration and allowance of the claims are respectfully requested. The Examiner is cordially requested to telephone, if the Examiner believes that it would be advantageous to the disposition of this case.

The Commissioner is hereby authorized to charge any additional fees or credit any overpayment, which may be required for this amendment, to Deposit Account No. 09-0463. In the event that an extension of time is required, or may be required in addition to that requested in any petition for an extension of time, the Commissioner is requested to grant a petition for that extension of time which is required to make this response timely and is hereby authorized to

charge any fee for such an extension of time or credit any overpayment for an extension of time to Deposit Account No. 09-0463.

Respectfully submitted,

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